

Results and Discussion

Figure 3, page 9, shows the locations of the wells which were sampled for this study. The areal extent of the ten wells encompasses approximately two and one-half square miles.

It is very important to have the well driller reports for the wells in a study in order to have a basic knowledge of the construction of the well and the lithology that the well was drilled through during construction. Regretfully, when a study area has specific boundaries of interest it is not uncommon that the well driller reports for all wells in the area were never submitted to Idaho Department of Water Resources (IDWR), which is the agency where such records are kept. Only three well driller reports, (sites #2, #5, and #6) could be found at IDWR.

The well driller report for site #5 states that the well depth is 231 feet deep with a bentonite seal from the ground surface down 20 feet. The lithology on the well driller report shows numerous clay layers that were drilled through when the well was developed. Site #6 has similar characteristics, the well is 245 feet deep with a 28 foot bentonite surface seal and numerous clay layers.

The well driller report for site #2 is distinctly different from site #5 and #6. The well driller report for site #2 states the well as being 74 feet deep with the well cuttings being used for an 18 foot surface seal. The lithology of this well is comprised of sandy clays, sands, and coarse sand/gravel.

Previous data indicates that ground water has been impacted in the shallow water bearing zones of the unconfined sandy soils of the alluvial fan of Little Gulch Creek. It appears that site #2 is located within those sandy soils of the shallow water bearing zone. Whereas the soil types appear to be of a different geologic composition where site #5 and #6 are located.

There is quite a difference in the ground water results for Site #5 and #6, compared to site #2. Site #5 and #6 had nitrate results of 1.79 and 1.8 mg/l, respectively, and no detections of pesticides or VOCs. Site #2 had a nitrate level of 45.2 mg/l and detections of dacthal, atrazine, 1,2-dichloropropane, and 1,2,3-trichloropropane.

A similar analogy is revealed when reviewing the data on the wells that did not have well driller reports available. Site #3 and #10 are reported by the owner's to be shallow wells. The owner stated that the well at site #3 is 65 feet deep and the well at site #10 is 120 feet deep. Both of these wells have been used for at least twenty years which could make the surface seal questionable and neither of the wells are flowing artesian (indicating that the well was drilled into the shallow, unconfined water bearing zone). The water quality of these two wells shows impacts from nitrate, dacthal (atrazine and metribuzen at site #3), and 1,2,3-trichloropropane (1,2-dichloropropane at site #3).

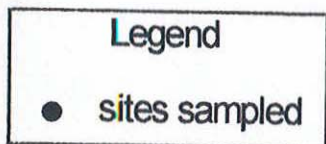
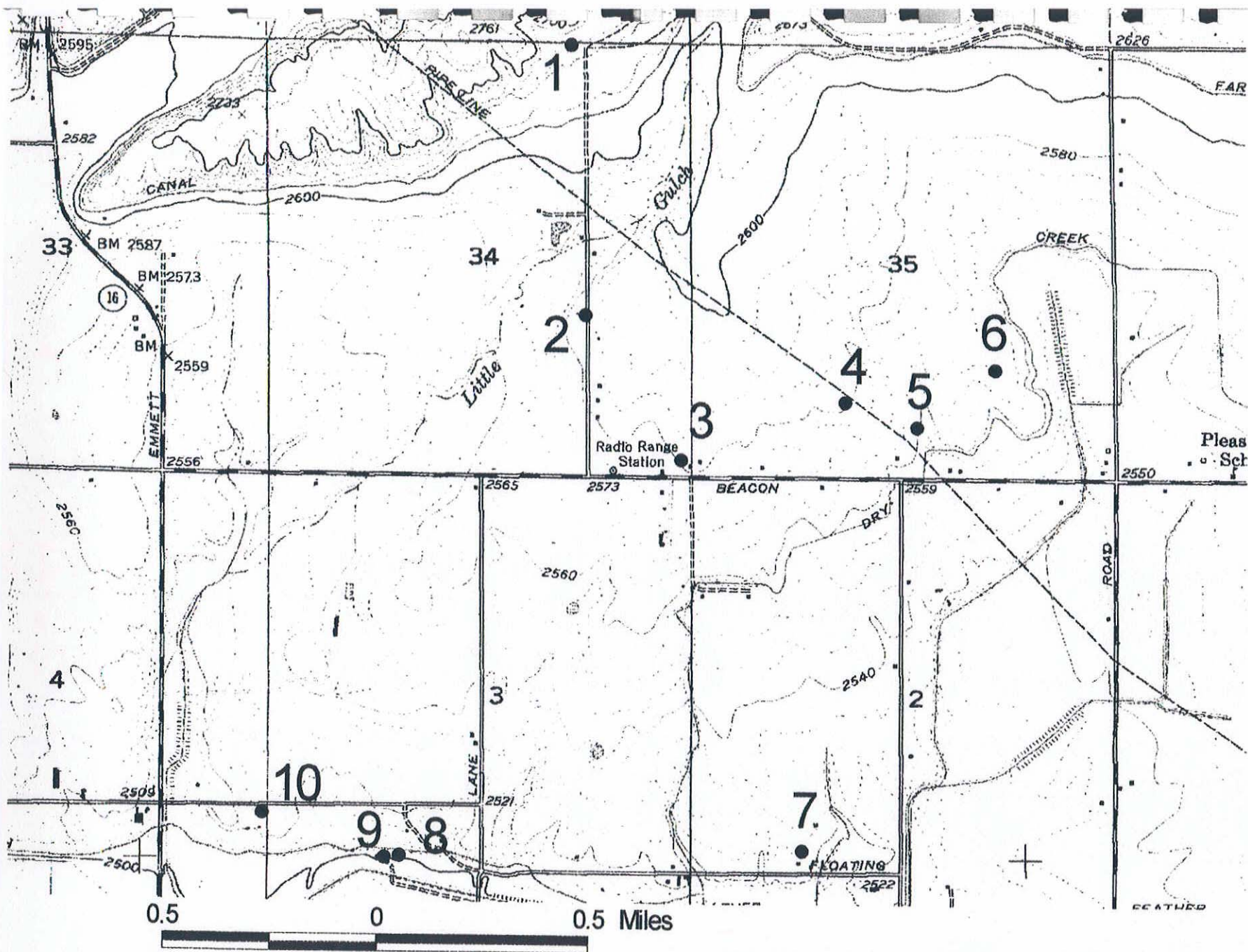


Figure 3. NW Ada County
Wells Sampled in Spring 1997

The owner of the well at site #1 states that this well is 351 feet deep. The depths of the wells at site #8 and 9 were unknown by the owner, but both wells are artesian (indicating that the wells are drilled into a deeper, confined water bearing zone). The ground water quality of these three wells are significantly different from the wells at sites #3 and #10. The nitrate levels at sites #1, #8, and #9 are 0.362 mg/l, 0.093 mg/l, and 0.1 mg/l, respectively. There were no detections of pesticides or VOCs in these three wells.

The divergence from the above trend is found with sites #4 and #7. The well owner states that their well at site #4 is 200-240 feet deep and the well at site #7 is 240 feet deep. Neither of these wells are known to be artesian and site #4 is only about 1000 feet away from site #5 (which the results did not show ground water impacts). Even though these wells (sites #4 and #7) are reported to be deeper wells the ground water quality shows impacts. The nitrate levels was 16.7 mg/l at site #4 with pesticide and VOC detections. Site #7 has a nitrate concentration of 0.253 mg/l with a low level of dacthal detected. Dacthal is the only constituent in the results that show an impact to the ground water quality at site #7.

Figure 4, page 11, shows the location of the wells with elevated nitrate levels. Figure 5, page 12, shows the location of the wells with dacthal detections. Table 3, page 13, shows the date the samples were taken, the field parameters at each site, and a list of the constituents which had results above the laboratory detection level for any of the wells sampled.

Conclusion and Recommendations

In conclusion, this study concurs with the previous studies by the Idaho State Department of Agriculture that there are ground water impacts in the shallow, unconfined, water bearing zones within the alluvial fan of Little Gulch Creek. The soils in this alluvial fan have an extremely fast percolation rate from the ground surface down to the ground water table.

The current land uses in this area may be following recommended guidelines for their operations, but the impacts to the ground water portrays problems with the current land uses as a possible consequence of the type of soil. The data shows the problems within the Little Gulch alluvial fan are probably occurring from the over application of fertilizers, pesticides/herbicides, and wastewater from the feedlot and the rapid infiltration basins. The other conceivable factor compounding the ground water impacts is from the close proximity and, consequently, concentration of the impacted ground water in the vicinity from agricultural production, the feedlot operation, and the rapid infiltration basins.

Based upon the historic and current information gathered for this area the following recommendations are:

- 1) Reiterate the Idaho State Department of Agriculture's recommendation for the well owners

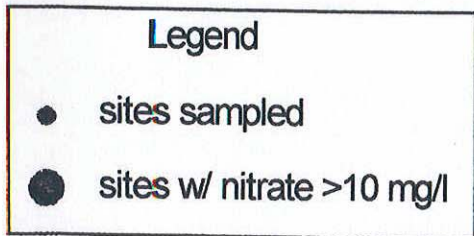
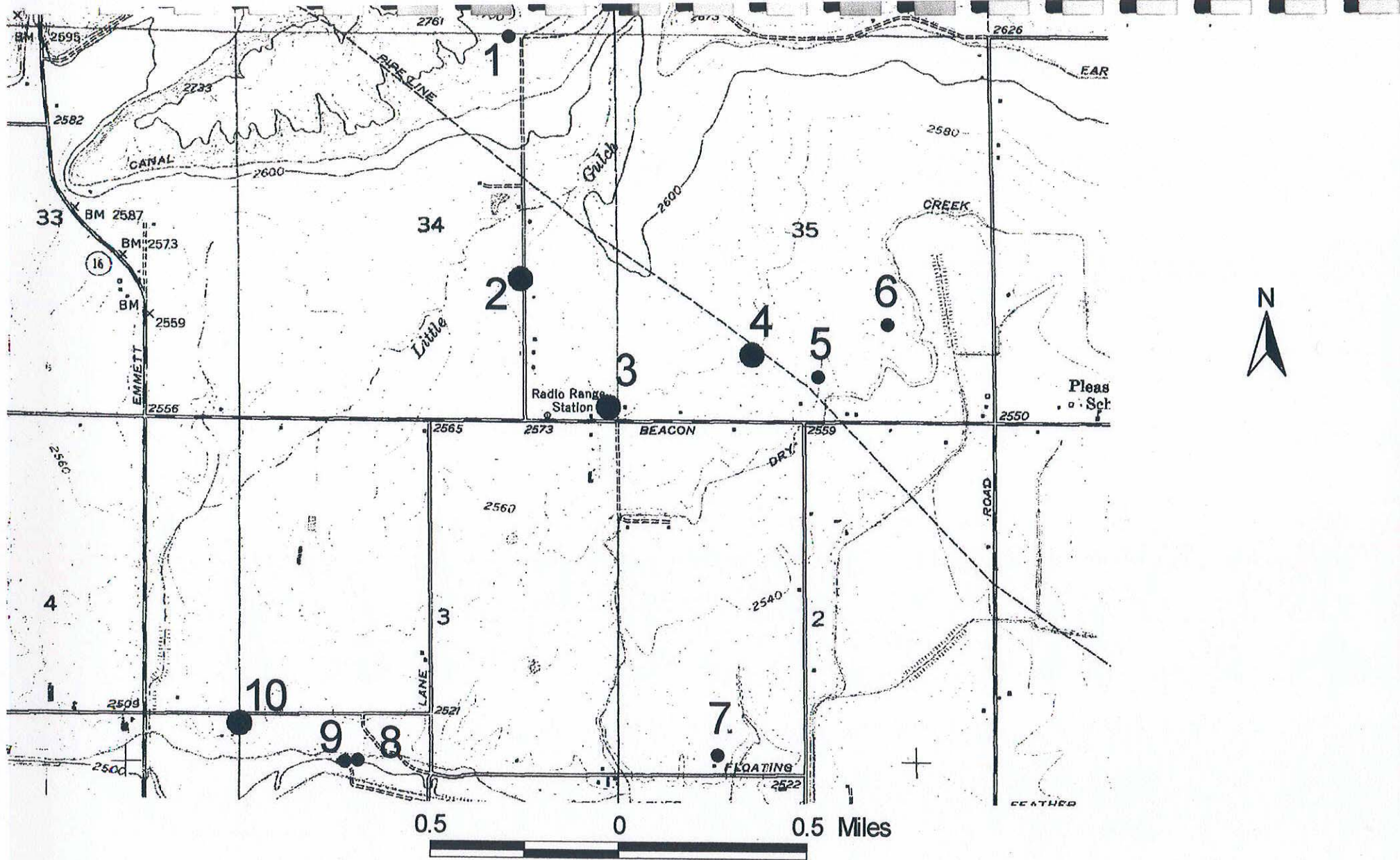


Figure 4. NW Ada County
Spring 1997 Nitrate Results

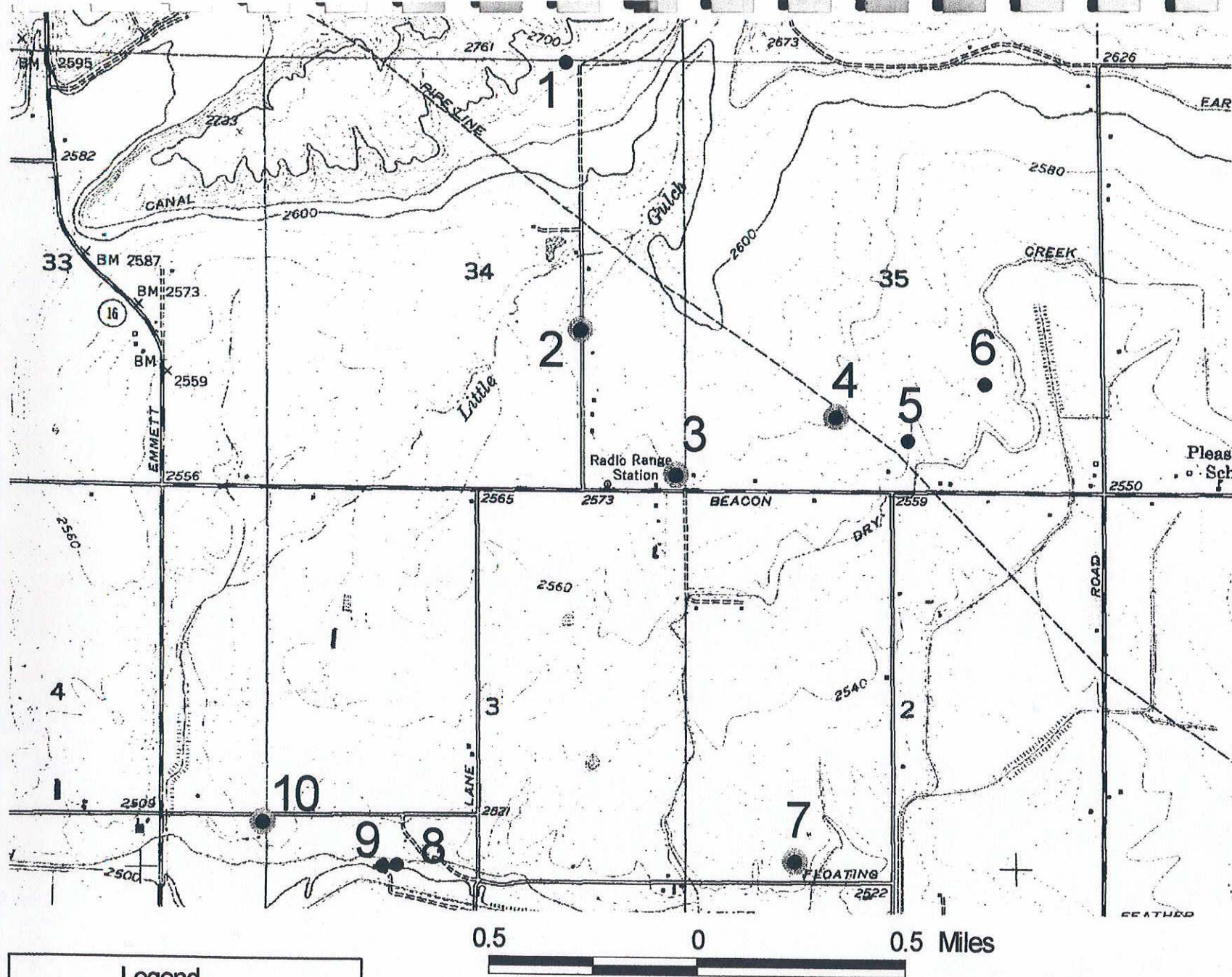


Figure 5. NW Ada County
Spring 1997 Dacthal Results

Table 3. NW Ada County March 1997 Sample Results

Site #	Date Sampled	Total Coliform col/100ml	Chloride mg/l	Nitrogen NH4 mg/l as N	Total Kjeldahl Nitrogen mg/l as N	Nitrogen NO2+NO3 mg/l as N	Total Phosphorus mg/l	Dacthal ug/l	Atrazine ug/l	Metribuzen ug/l	1,2-dichloro propane ug/l	1,2,3-tri-chloro-propane ug/l	Water Temp °C	pH standard units	Specific Conductance US/CM
1	03/12/97	absent	7.1	0.01	ND	0.362	0.05	ND	ND	ND	ND	ND	15.6	7.44	245
2	03/12/97	absent	57.1	0.009	0.09	45.2	0.21	42	0.019	0.19	0.62	12.4	13	6.97	1025
3	03/11/97	present	17.9	0.007	0.15	12.4	0.22	3.1	0.014	0.06	ND	1.6	13.9	7.32	509
4	03/12/97	absent	17.9	0.01	ND	16.7	0.24	23	0.054	0.14	0.41	6.73	12.5	7.36	699
5	03/11/97	absent	8.9	0.011	ND	1.79	ND	ND	ND	ND	ND	ND	14.2	7.28	476
6	03/11/97	absent	8	0.006	ND	1.8	ND	ND	ND	ND	ND	ND	13.6	8.56	444
7	03/12/97	absent	1.8	0.007	ND	0.253	0.06	0.25	ND	ND	ND	ND	15	7.33	208
8	03/11/97	absent	3.6	0.008	ND	0.093	0.06	ND	ND	ND	ND	ND	14.8	7.37	213
9	02/20/97	present	2.8	0.005	ND	0.1	0.05	ND	ND	ND	ND	ND	14.4	7.44	214
10	03/12/97	absent	10.7	0.008	ND	10.6	0.08	0.022	ND	ND	ND	0.18	14.1	7.09	445

LEGEND

ND = non-detect

non-detect levels are:

Total Kjeldahl Nitrogen as N = <0.05 mg/l

Total Phosphorus = <0.05 mg/l

Dacthal = <0.008 ug/l

Atrazine = <0.013 ug/l

Metribuzen = <0.015 ug/l

1,2-dichloropropane = <0.21

1,2,3-trichloropropane = <0.21 ug/l

with elevated nitrates (greater than 10 mg/l) to obtain alternatives for domestic water sources or treatments.

2) Request that the Idaho Department of Water Resources thoroughly review well abandonment and construction practices in the Northwest Ada County area to prevent cross contamination of the impacted shallow water bearing zone into the deeper water bearing zone.

3) The newly adopted ground water rules by the Department of Health and Welfare, Division of Environmental Quality (IDAPA 16.01.11.400.03) addresses what shall take place when ground water contamination exceeds a ground water standard. The study area exceeds the ground water standard for nitrate. The following is the wording from the ground water rules: "The discovery of any contamination exceeding a ground water standard that poses a threat to existing or projected future beneficial uses of ground water shall require appropriate actions, as determined by the Department, to prevent further contamination. These actions may consist of investigation and evaluation, or enforcement actions if necessary to stop further contamination or clean up existing contamination, as required under the Environmental Protection and Health Act, Section 39-108, Idaho Code."

The new ground water rules should, at a minimum, be the impetus for the agency/interagency combined efforts for implementing "Best Management Practices" for the land uses in the area, such as:

a) The Idaho State Department of Agriculture need to work with the area farmers to establish agronomic rates for fertilizer and pesticide/herbicide use.

b) The Idaho State Department of Agriculture, the Environmental Protection Agency, and the Division of Environmental Quality need to work with the Idaho Feedlot to establish agronomic rates for operation's wastewater application. Also, determine the integrity of the seal in the wastewater lagoons.

c) The Division of Environmental Quality and the Eagle Sewer District need to determine if the rapid infiltration basins are contributing to the nitrate concentration in the ground water of the area.

4) Periodic ground water sampling of the wells at sites #2 and #10 by the Division of Environmental Quality. Site #2 is the most impacted well from the agricultural practices. Site #10 appears to be the most downgradient well of the ground water impacts and past three ground water sampling episodes have shown a significant increase in the nitrate concentration. These two wells could provide the trend ground water quality information for this area.

Acknowledgment

I want to express a sincere thank you to all the well owners who granted permission to enter their property and sample their well water. Thanks, also, for the assistance from my partners Rob Howarth, DEQ, and Gary Bahr, ISDA, in helping to keep everything running smoothly. And to My DEQ co-workers Anjanette Cude, Ron Lane, Rob Howarth, Dean Yashan, and Ed Hagan for diligently reviewing and commenting on the draft report. Also to Gary Bahr, ISDA, for diligently reviewing and commenting on the draft report.